National Institute of Environmental Health Sciences

Indices for extreme events in projections of anthropogenic climate change

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Abstract:

Indices for temperature and precipitation extremes are calculated on the basis of the global climate model ECHAM5/MPI-OM simulations of the twentieth century and SRES A1B and B1 emission scenarios for the twenty-first century. For model evaluation, the simulated indices representing the present climate were compared with indices based on observational data. This comparison shows that the model is able to realistically capture the observed climatological large-scale patterns of temperature and precipitation indices, although the quality of the simulations depends on the index and region under consideration. In the climate projections for the twenty-first century, all considered temperature-based indices, minimum Tmin, maximum Tmax, and the frequency of tropical nights, show a significant increase worldwide. Similarly, extreme precipitation, as represented by the maximum 5-day precipitation and the 95th percentile of precipitation, is projected to increase significantly in most regions of the world, especially in those that are relatively wet already under present climate conditions. Analogously, dry spells increase particularly in those regions that are characterized by dry conditions in present-day climate. Future changes in the indices exhibit distinct regional and seasonal patterns as identified exemplarily in three European regions.

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Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES), Other Climate Scenario

Special Report on Emissions Scenarios (SRES) Scenario: SRES A1, SRES B1

Other Climate Scenario: A1B

Exposure :

weather or climate related pathway by which climate change affects health

Precipitation, Temperature

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Europe

Health Impact: ☑

specification of health effect or disease related to climate change exposure

General Health Impact

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Children, Elderly

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Long-Term (>50 years)

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content